Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Parts 1, 2, 22, 24, 27, 90 and 95 of	)	WT Docket 10-4
The Commission's Rules to Improve Wireless	)	FCC 11-53
Coverage Through the Use of Signal Boosters	)	
_____	)	

REPLY COMMENTS
NOTICE OF PROPOSED RULEMAKING

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Introduction

Michael Millard and Jeremy K. Raines, Ph.D., P.E., inventors of the Smart Booster, are pleased to submit these Reply Comments concerning the NPRM Docket 10-4. After reviewing the Comments submitted thus far in the proceeding, we continue to believe that intelligent boosters are the only viable solution to the dual problems of satisfying consumer demands for reliable communication in rural and fringe areas of signal coverage, and satisfying the concerns of wireless networks about interference from boosters.

An intelligent booster's operation is automatically restricted to that part of the spectrum licensed to the subscriber's network provider and will operate *only* at those locations where it is actually needed. In this way, an intelligent booster does not force carriers to surrender their spectrum stewardship, which has long been proven to be the most effective means of interference reduction and efficient spectrum utilization.

Because intelligent boosters will not operate in areas densely populated by base stations, there is no concern that they might interfere with them. Where they are operable, intelligent boosters employ anti-oscillation, automatic gain, and remote shut-down features to further protect the networks. Further, intelligent boosters are the only boosters considered thus far in these proceedings that fully comply with a multitude of FCC rules and regulations, including those relating to the protection of Radio Quiet Zones and radio telescopes, the Sprint/Nextel public safety interleaved spectrum, spectrum lease and negotiated interference agreements between different carriers, E-911 operation, and a host of other special concerns. No other signal booster complies with these rules and regulations.

We particularly take note of the Joint Proposal, dated July 25, 2011, submitted by Verizon and Wilson Electronics (the "Joint Proposal"). While it is commendable that a dialogue has begun between a wireless network provider and a booster manufacturer, that dialogue so far has served chiefly to raise many red flags of alarm. It certainly has *not* produced a solution that will provide more reliable wireless communication for the consumer. The Joint Proposal is far more concerned with protecting the networks than it is with solving reception problems in rural and other areas of weak signal strength.

Note that the opening paragraph of the NPRM states clearly that the consumer must be served:

> "We initiate this proceeding to facilitate the development and deployment of well-designed signal boosters, which hold great potential to empower consumers in rural and underserved areas to improve their wireless coverage in their homes, at their jobs, and when they travel by car, recreational vehicle, or boat."

In contrast to the above expressed goal of the NPRM, the Joint Proposal clearly states at the outset that:

> "In response to the NPRM, Verizon Wireless, V-COMM, a wireless engineering consulting firm, and Wilson have jointly developed a proposal ('Joint Proposal') for the design, operation, and, where necessary, installation of signal boosters *in a manner that will better ensure protection against harmful interference*."

Apparently, the only goal of the Joint Proposal is to protect the wireless networks from any possibility of interference. In the zealous pursuit of that goal, it does not contain any relief for the consumer in rural and fringe coverage areas. In fact, if anything, according to the Joint Proposal, boosters for the consumer are so constrained as to be practically useless.

A critical examination of the Joint Proposal clearly shows that the consumer in rural and fringe areas will not be served, and, in fact, will be substantially worse off than in the present circumstances. Emergency 911 calls that cannot be connected today will remain unconnected. Emergency 911 calls in marginal areas that today have some probability of being connected will lose even that chance of connecting. Further, absolutely no protection is offered to Quiet Zones, radio telescopes, and other special facilities, or in situations that are safeguarded by FCC regulations. In fact, the Joint Proposal will perpetuate and further aggravate interference in urban and other areas densely populated by base stations.

Common sense, supported by detailed engineering calculations, will show in the sections that follow that the Joint Proposal is a certain prescription for tragedy and disaster. It is a tragedy with respect to serving the consumer. It is a disaster with respect to preventing interference to the carriers.

Although Smart Booster disagrees with the Joint Proposal, it strongly agrees with Comments submitted by other parties. These parties include T-Mobile and Blooston Licensees.

Comments submitted by T-Mobile strongly support intelligent boosters. Intelligent boosters provide the features specified by T-Mobile, as will be described in detail later in these Reply Comments. Further, intelligent boosters are completely compatible with existing blanket licensing rules. There is no need for a new license-by-rule as proposed in the NPRM. Smart Booster strongly agrees with T-Mobile that license-by-rule would be counterproductive for the wireless industry for the many reasons it articulates.

Comments submitted by Blooston Licensees similarly support intelligent boosters. As they recommend, intelligent boosters can be readily treated as subscriber equipments such as handsets. Also, in the terminology of Blooston Licensees, intelligent boosters are "carrier-specific" and "carrier activated."

Smart Booster hopes that dialogues between booster companies and wireless providers will continue.

The Wilson/Verizon Proposal Raises Numerous Red Flags.

Rather than solve the problems set forth in the NPRM, the Wilson/Verizon proposal (the "Joint Proposal") creates a new, under-powered class of boosters for consumers that is guaranteed to satisfy nobody. In fact, the category of under powered boosters presents new problems rather than solving old ones. It will not transmit enough power to help users in rural America, and at the same time it radiates too much power to protect the networks in areas where boosters are unnecessary. As these Reply Comments will show, this new booster for consumers produces an output power that is roughly one-third that of many new, popular handsets alone, as readily seen in Attachment 2. In view of its greatly reduced power, it is hardly a "booster. In fact, more accurately it is a signal attenuator.

Rather than solve the fundamental problems of interference from higher powered boosters, the Joint Proposal simply defers them, or figuratively kicks that can down the road, asserting that

industry will, in some unspecified way, and at some unspecified date, develop a plan to deal with them. We ask, Isn't the development of a specific plan the whole purpose and intent of these proceedings?

It is alarming that the Joint Proposal is almost entirely devoid of discussion, rationale, and substantiation for its specifications. Instead, those specifications are presented as foregone, hard and fast engineering conclusions, not subject to challenge. Close examination, however, reveals much in the way of omissions, sleights-of-hand, and numbers that simply do not make any sense. Some of those are:

1. The Joint Proposal is only a 600 milliwatt placebo, with not nearly enough power to get the job done.

The consumer device in the Joint Proposal is trumpeted as radiating a full watt; however, this is but one of many sleights-of-hand intended to make it appear more capable than it is in reality. In fact, that one watt is expressed in units of EIRP (Effective Isotropic Radiated Power), which is inflated compared with units of ERP (Effective Radiated Power). The latter are used in the FCC Rules governing cellular handset emissions. In terms of ERP, the Joint Proposal's consumer device radiates only 0.6094 watts, or about 600 milliwatts (mW).

In comparison with FCC Rule 22.913(c)(2), which specifies a maximum permissible cellular mobile output power of 7,000 mW ERP, the 600 mW ERP limit in the Joint Proposal is not only inadequate, but laughable.

The use of ERP instead of EIRP provides a more honest comparison of the Joint Proposal's 600 mW consumer booster with new and popular handsets, whose output powers are specified in terms of ERP. These are tabulated in Attachment 2. For example, the Research In Motion BlackBerry Bold 9930 handset, marketed by Verizon Wireless starting just last week, has a maximum output power of 1,644 mW ERP[1]. If Verizon is so convinced that a mere 600 mW booster can get the job done in rural America, then why does it offer handsets with

[1] See: RF Test Report, FCC ID# L6ARDU70CW, pp 8, section 8.2.1 "Peak Output Power – GMSK Mode", CETECOM ICS Services GmbH for Research In Motion BlackBerry Bold 9930, available in Verizon stores Aug 25, 2011. Please note the date: one day into the future.

nearly three times that output power for use in urban areas? In comparing different boosters, the typical consumer does not realize that 1 watt EIRP is only 0.6 watt ERP, and as a result will be misled into believing the Joint Proposal's consumer booster is over 50 percent more powerful than it actually is. It is hoped that consumer advocacy groups will alert consumers that the Joint Proposal's use of EIRP instead of ERP is a veiled attempt to artificially inflate the booster's true performance, and their expectations.

If we look closely at the engineering details, they readily confirm that 600 mW is not sufficient to provide wireless communication in fringe and rural areas where the consumer is located far away from the nearest base station. Those engineering details are as follows.

The Joint Proposal defines a category of signal boosters for consumers (the "Verizon & Wilson device") that would limit uplink power to 600 mW. This so-called booster is more appropriately regarded as an attenuator in view of the fact that several newly marketed handsets without boosters can radiate uplink power at least as great as 1,644 mW. Further, cellular Part-22 rules permit devices with power as great as 7,000 mW. The PCS Part-24 rules permit devices with power as great as 2,000 mW EIRP, or 1,218.8 mW ERP. So, the Verizon & Wilson device is not really a booster at all. For the consumer in a rural or fringe coverage area it is useless.

A critical engineering analysis confirms that the Verizon & Wilson device will do nothing but create a false sense of complacency for consumers. Fig. 1 illustrates many of the factors that determine whether or not wireless communication will be successful in a rural environment. The range, or distance between the handset and the base station, is an obvious one. Another important one is the fade margin. This takes into account a host of phenomena that attenuate a signal as it propagates between the handset and the base station. These include blockage by obstacles, absorption by precipitation and vegetation, and destructive interference from multi-path.

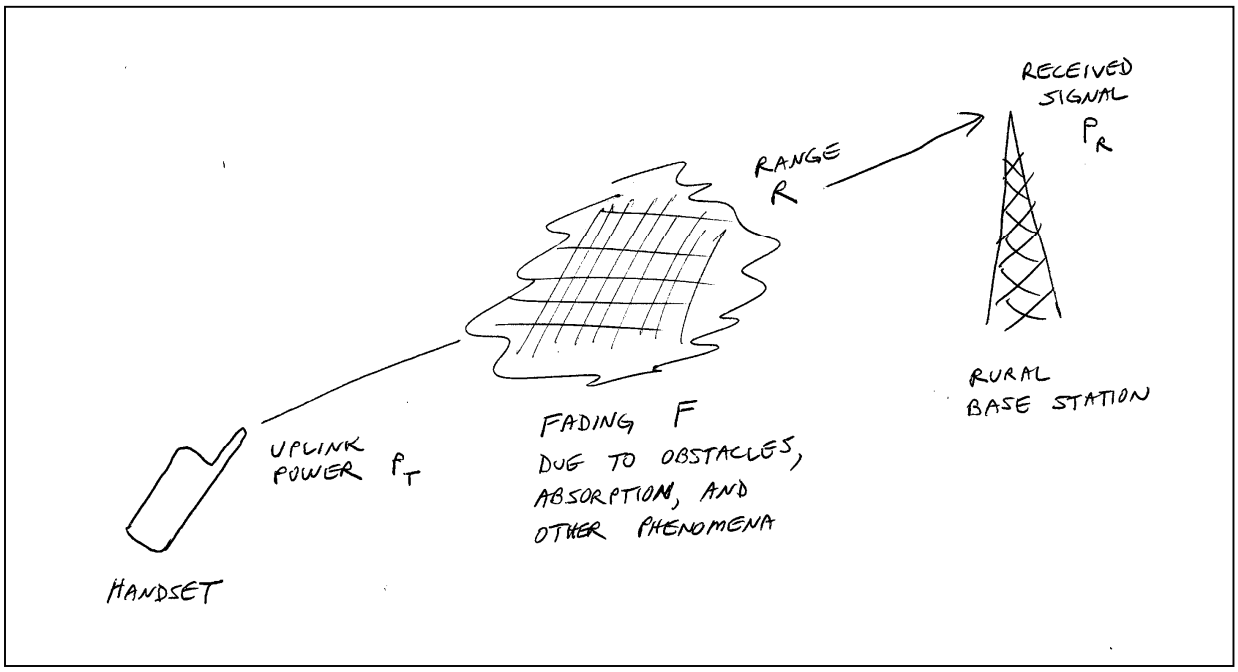

Fig. 1 The factors that determine the success or failure of wireless communication in a rural environment include the range R and the fade margin, or fading, F. In a rural environment, the uplink power of a handset must be boosted to compensate for these factors.

The factors illustrated in Fig. 1, plus others, are quantified in the classic Friis transmission formula[2]. That formula was used to create the design curves shown in Fig. 2. An objective examination of these curves shows conclusively that the Verizon & Wilson device would be completely useless to consumers who rely upon it in a rural environment.

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[2] The Friis transmission equation is used in telecommunications engineering, and gives the power received by one antenna from another antenna some distance away transmitting a known amount of power. The formula was derived in 1945 by Danish-American radio engineer Harald T. Friis at Bell Labs, and published as "A Note on a Simple Transmission Formula," Proc. IRE, 34, May 1946, pp. 254-6.

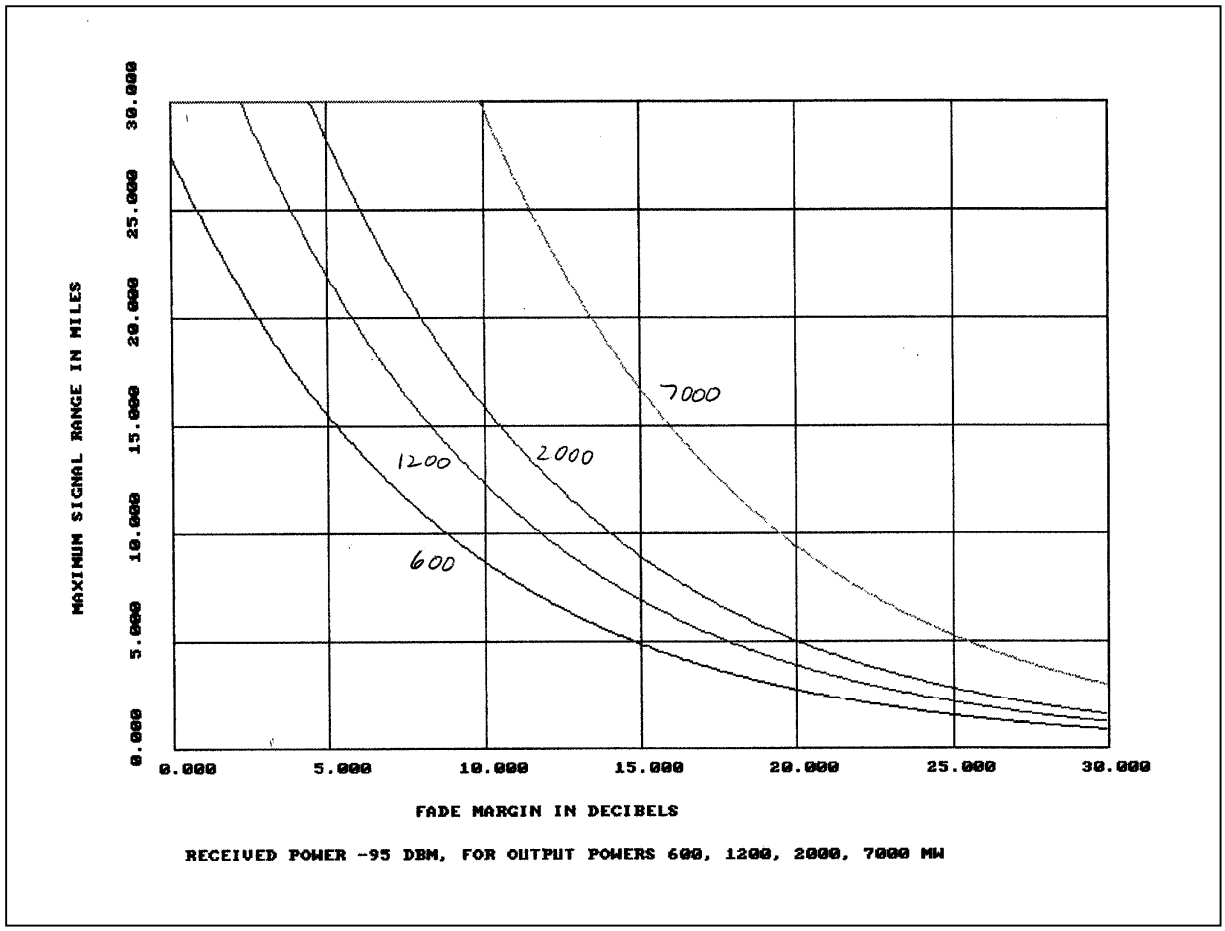

Fig. 2. With an optimistic fade margin of 10 dB, the 600 mW Verizon & Wilson device will not deliver a useable signal further than about 8 miles, not far enough to reach the nearest base station in a rural environment. For greater fade margins likely to be encountered in emergency situations, the signal will not travel even that far.

It is seen that signals from the handset travel further for greater output power and for lesser fade margin; however, the designer has little control over the latter factor. It is a function of the environment, taking into account a host of phenomena such as blockage by obstacles, attenuation by precipitation and vegetation, and destructive interference from multi-path wave propagation. Even for an optimistic value of 10 dB, the 600 mW Verizon & Wilson device is not going to deliver a useable signal to a rural base station, which is likely to be far more than 8 miles away. Further, the fade margin is likely to be much greater than 10 dB under emergency conditions. For example, during severe weather, intense precipitation, smoke, and ash will increase the absorption of radio waves. With the fade margin substantially increased by these phenomena, the Verizon & Wilson device will be completely unreliable.

The design curves answer some very practical questions that provide insight into how powerful a booster might actually be required in a rural environment. For example, how much uplink power is required to reach a base station 15 miles away, with a fade margin of 10 decibels? From the curves, it is readily seen that neither the Verizon & Wilson device nor a handset alone can do the job. In fact, this example illustrates exactly why boosters are necessary in a rural environment. It is seen that boosters that provide either 2,000 mW or up to 7,000 mW uplink power readily deliver the required signal to the base station.

Similarly, it is seen that only a 7,000 mW booster can deliver useful signals to rural base stations that are 20 and 25 miles away. The booster will just about reach a station from a distance of 30 miles.

From the above, it is seen that the Verizon & Wilson device intended for the consumer will actually deliver nothing but a false sense of security in a rural environment. Further that false sense of security becomes life threatening in an emergency situation when the consumer relies upon that device in a futile attempt to place an E-911 call.

2. While 600 mW is not nearly enough to get the job done, it is still sufficient to harm the networks when deployed with impunity.

600 mW can do plenty of damage to a wireless network in an area densely populated with base stations, that is, where boosters are neither needed nor wanted. This is readily shown using the same classic Friis transmission formula employed in our earlier discussion. Fig. 3 shows what will happen to a base station when the Joint Proposal's 600 mW booster is located not too far away.

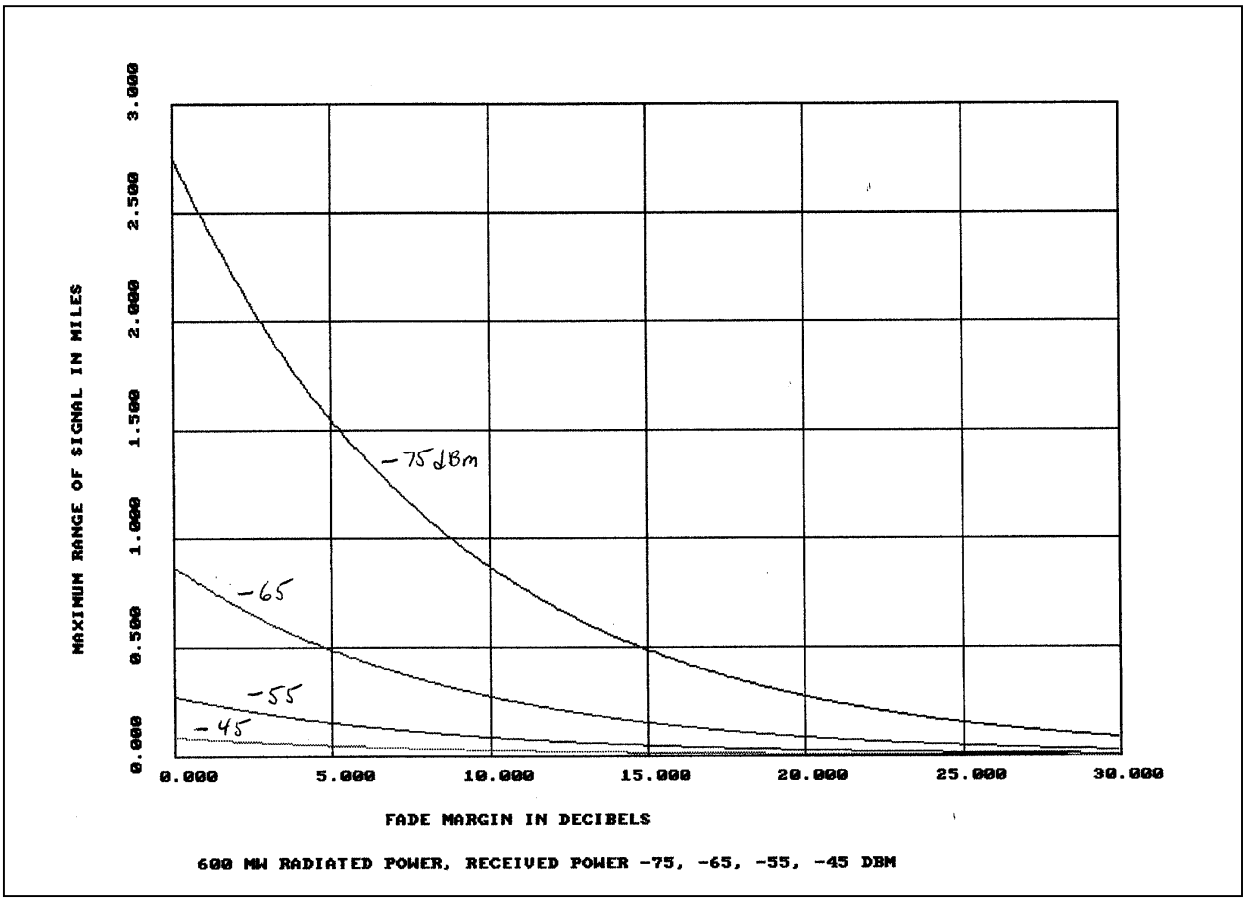

Fig. 3. Signals sufficiently strong to disrupt a wireless network are sent to a base station from a 600 mW booster at close range. The signals can easily be 50 dB greater than what the network is designed to accommodate.

Assuming the same 10 dB fade margin that was used in our previous calculation, it is seen that a 600 mW booster at a range of about 0.1 mile will deliver a -45 dBm signal to the base station receiver. That is 40-55 dB greater than the -100 dBm to -85 dBm signal that the receiver is designed to expect. Similarly, a 600 mW booster at a range of about 0.8 mile will deliver a -75 dBm signal, which is 10-25 dB greater than the receiver expects. Quite clearly, a booster should not be activated at these ranges; however, that is precisely what is going to happen according to the Joint Proposal.

The above is a conservative estimate of damage because the closer the booster is to the base station, the less the fade margin is likely to be. It is less likely that the signal will be attenuated as much by obstacles and precipitation. So, the assumed value of 10 dB is

perhaps too generous in this calculation. It is more likely to be 6 dB, 3 dB or less because, for example, there are fewer obstacles along the path. For those values, an even stronger and more damaging signal is delivered by the booster.

Exploring the above a bit further, Fig. 4 presents similar results in a different format. The base station is designed to for best operation when the received signals are in the range from -100 dBm to -85 dBm.

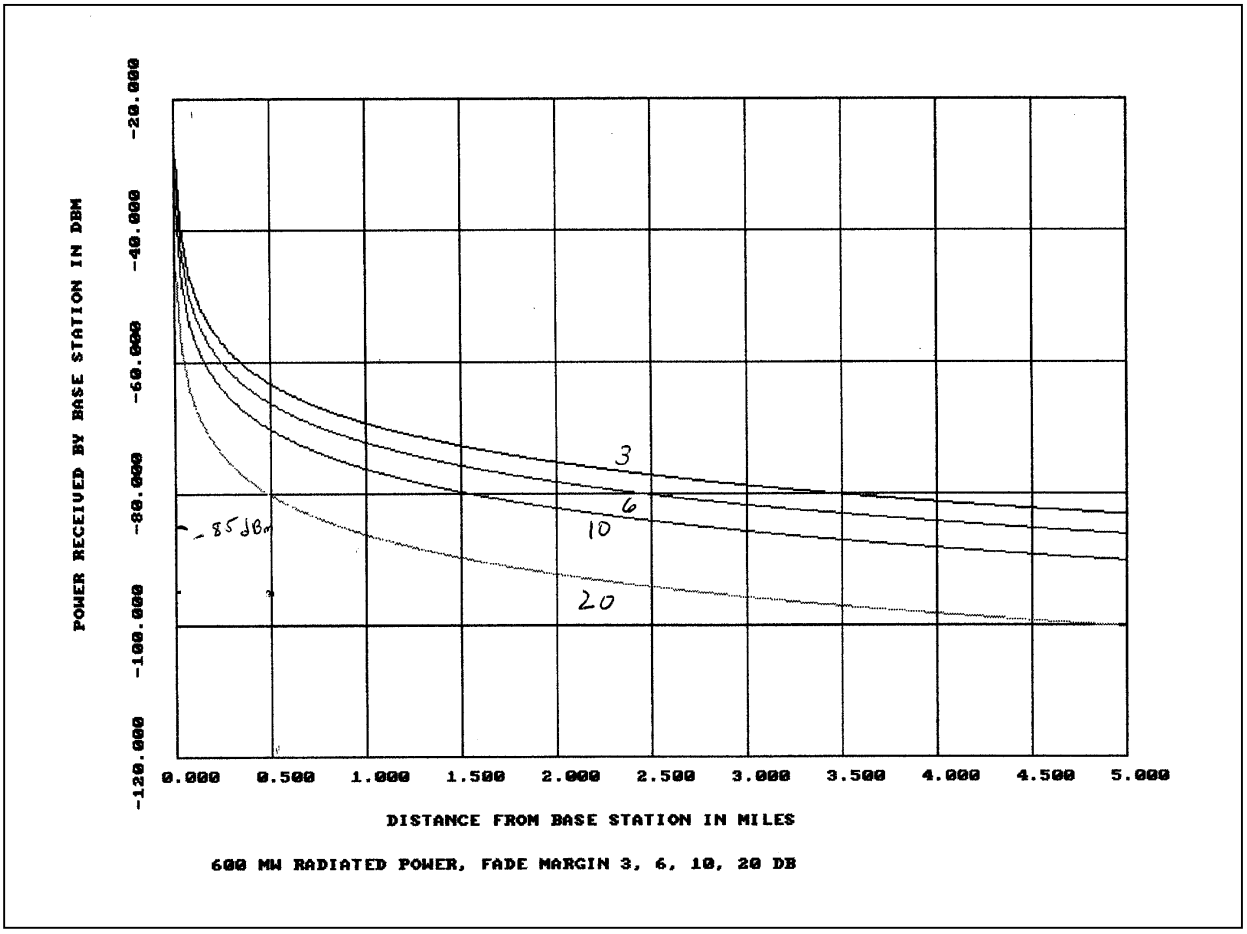

Fig. 4. Even for a conservative fade margin of 10 dB, the 600 mW Joint Proposal booster delivers an excessive signal from as far away as 3 miles. For fade margins of 3 dB and 6 dB, which are likely at close distances such as these, an excessive signal is delivered from 5 miles away or more. As the booster moves closer to the base station, the signal can exceed what the base station expects by over 50 dB.

It is seen that the signals sent from the 600 mW Joint Proposal booster to the base station exceed design values, even from distances miles away.

There have been vague discussions about using a technique called “downlink sensing” to prevent excessive signals from boosters at close ranges to base stations; however, this technique is fundamentally flawed. Those flaws were discussed in detail in our Comments to these proceedings[3].

Only an intelligent booster will be reliably deactivated in proximity to base stations and at other locations where it is not needed.

Aside from the above problem with its 600 mW booster operating where it should be deactivated, the Joint Proposal recommends that a malfunctioning booster be allowed to restart up to five times, at one minute intervals, if it somehow detects that it is operating outside of its design parameters. However, in densely populated areas saturated with base stations, this recommendation will prove disastrous. The reasons are as follows.

According to the Joint Proposal, the booster will have 300 milliseconds, or about one-third second to detect the malfunction and attempt to correct it. If the attempt proves unsuccessful, the booster will reset itself and then turn off its uplink amplifier for one minute. After waiting for one minute, it will restart. This procedure can be repeated up to five times before requiring a manual reset by the device operator.

Imagine a location such as Times Square, New York, with numerous base stations and handsets in use. Suddenly, a booster malfunctions and swamps all nearby base stations with excessively strong signals. If the impairment is strong enough, then in only 70 milliseconds the nearby cell site sectors will drop every voice call and data session in use because modern networks can not continue to process calls if they lose connectivity, in particular frame synchronization, for this amount of time.

Those dropped calls are re-attempted while the malfunctioning booster resets itself, and they are re-connected without incident. However, in deference to Verizon’s advertising slogan, those re-connected calls are likely to get about as far as “Can you hear me now?”, before the offending booster completes its reset procedure and starts the whole process of

[3] See Comments of Smart Booster, NPRM Docket 10-4, July 22, 2011, pages 10-13. http://fjallfoss.fcc.gov/ecfs/document/view?id=7021696074

disruption all over again. We anticipate that these situations will be enormously frustrating to subscribers.

In that one minute reset interval, what, if anything, about the booster or its operating environment can be expected to change? Is it not more likely that the device will continue to malfunction, exhausting its five retry attempts? And with enough boosters in the same locale, won't this problem continue unabated as users continue to manually reset their boosters?

Because the Joint Proposal doesn't solve the fundamental problem of permanently deactivating boosters where they are not truly needed, it has substituted one bad problem for another. Now, when a booster malfunctions, carriers can be assured that they will never locate the offending device while it continues to cause dropped calls and critically impair the networks. This is because, according to the parameters described in the Joint Proposal, in order to locate and disable an interfering and malfunctioning booster, a technician must be dispatched within that first reset minute, and be so adept at signal triangulation, that he or she is able to pinpoint the device's location in less than 1.5 seconds of total signal acquisition time (*i.e.*, 300 mS x 5 attempts). Of course, this expectation is absurd.

From the above, it is seen that carriers will never locate malfunctioning boosters, and that those boosters will continue to cause dropped calls on the networks without any relief in sight. When enough boosters are allowed to operate in densely populated areas, the networks will be crippled, and there will be no practical means to recall the offending devices in order to restore the networks.

The above problem is completely avoided by intelligent boosters because they never activate in areas densely populated by base stations.

3. The Joint Proposal lacks any means for remote shut down of malfunctioning boosters.

There is no provision for using remote control to shut down units that malfunction. Surely, this should be a high priority for the wireless carrier providers. Presently, they expend significant resources tracking down and deactivating boosters that interfere with their networks.
In contrast, an intelligent booster features a kill switch that can be activated by an authorized technician using a remote control unit.

4. The Joint Proposal's consumer booster is expected to violate multiple federal laws that protect Quiet Zones and radio telescopes.

The Joint Proposal emphasizes protecting the wireless networks, but contains absolutely no provisions for protecting Quiet Zones, radio telescopes, and other facilities and geographic regions covered by FCC regulations[4]. In contrast, the Smart Booster readily protects those facilities and regions, using its *a priori* knowledge of the network contained in its removable, updateable memory.

Note that existing signal boosters currently marketed and sold by a wide array of booster manufacturers are similarly expected to violate the same laws.

5. The Joint Proposal cannot recall obsolete boosters.

The Joint Proposal contains no provision for recalling units after they become obsolete, when they may impede future versions of wireless networks. In fact, there is no provision for selectively activating the units.

[4] See: 47CFR1.924

6. The Joint Proposal's consumer booster is supposed to be registered but, in fact, is shipped "ready to use", without any means for enforcing registration.

They are shipped in operating condition. Controlled deployment as intended relies upon an unrealistic honor system involving registration with the carrier or a carrier clearinghouse. There is no provision for preventing that registration from conveying when the booster is sold or relocated. There is some vague discussion of using a wireless Bluetooth® connection between the handset and the booster, so that the former can command the latter to activate or deactivate. No practical design has been offered to that end, however, and an entirely new generation of handsets would be required for every subscriber. In brief, the scheme is nothing more than speculation or a pipe dream. In contrast, the Smart Booster will not operate until its removable and updateable memory is installed.

In contrast to the Joint Proposal's uncontrolled distribution of its device, the removable and updateable memory gives carriers substantial control over the distribution and deployment of intelligent boosters. For example, carriers can decide whether the memory will be shipped with the booster, or shipped separately following a registration process. Further, to ensure that the carrier's desires are always met in a timely manner, the intelligent booster will cease to operate when the expiration date recorded in that memory has passed. It is therefore seen that any registration process deemed desirable by the carriers is realized and automatically kept current as subscribers continue to obtain required, periodic memory updates.

7. The Joint Proposal creates a new under-powered class of booster that does not satisfy the intent of the NPRM.

The Joint Proposal arbitrarily sorts signal boosters into one of three categories:

1) "Carrier Grade" devices are installed, controlled and maintained by the carriers and are not affected by the NPRM as it relates to interference abatement or the empowerment of consumers to enhance their coverage in rural and other areas of weak signal strength. Existing FCC Rules already allow carriers to install such devices, and so no new regulations are required. Indeed, even the Joint Proposal offers no modification to the *status quo* for such devices.

2) “Consumer Boosters” are a new category of booster with output power limited to no more than 600 mW ERP. There are other requirements such as anti-oscillation, downlink signal sensing, and other attributes one might expect to be useful in a consumer grade booster. What is not disclosed is that 600 mW is not enough power to get the job done, as has already been explained in great detail.

3) “CEO Boosters” comprise nearly every booster currently on the market, the very same boosters that are of chief concern in the NPRM. Instead of addressing that concern, the Joint Proposal asserts that as yet unspecified rules relating to the use of these boosters can be developed by an unidentified industry standards committee at some future date, and thus need not be solved as part of the NPRM proceedings. Therefore, this category is a catchall for the proverbial can that is kicked down the road, with no resolution of its intrinsic problems in sight.

Smart Booster believes the above categories are entirely artificial with no defendable basis in either common sense or engineering calculations. They are nothing more than constructs designed to accommodate existing, non-intelligent boosters that cannot simultaneously satisfy consumer demands for improved signal coverage and network concerns about interference. Certainly for intelligent boosters, there is no need whatsoever for these categories.

Of the three arbitrary categories, Consumer Boosters are of chief concern here. Presently, very few such 600 mW boosters exist. Indeed, out of the fifty-two distinct signal booster applications described on Wilson Electronics’ web site, *only one* model has an output power this low. The rest produce at least twice this amount, and the vast majority produce least five times as much. A detailed listing of Wilson Electronic devices presently offered for sale on its official web site is included here as Attachment 1. Similar charts can be constructed for other booster manufacturers.

There is no evidence that the avalanche of comments from laypersons submitted in these proceedings are trumpeting or in any way exulting the benefits of an under-powered, 600 mW signal booster. In fact, they are not using 600 mW boosters, but higher powered devices. Logically, in considering the Joint Proposal, the FCC should discount the vast majority of those

comments. They do not apply to a 600 mW device, and they clearly do not reflect or anticipate marketplace acceptance of such a device.

Clearly Wilson Electronics did not build its present reputation on a product line of 600 mW boosters, and we wonder what will become of its present product line, most of which appears to fall into the CEO booster category. Will existing units be confiscated from the hands of individual consumers and from the shelves of retailers and distributors? Will they be grandfathered and permitted to continue to violate the specifications of the Joint Proposal for consumer boosters?

8. The Joint Proposal lumps existing boosters into a category that is deferred while waiting for unspecified regulations to be determined at some unspecified date, meanwhile removing them from the hands of consumers.

With regard to "CEO Boosters", we note that the overwhelming majority of existing signal boosters currently available to the public fall within this category. That is, the present boosters used by individual consumers would be reclassified into this category. As a result, would they be confiscated from consumers, or would they be grandfathered, thus perpetuating the interference that they presently cause? Since practically the entire product line of Wilson boosters fall into this category, will Wilson abandon that line in favor of marketing under-powered 600 mW signal boosters to its present customer base? Further, why would other booster manufacturers follow Wilson's lead?

As with the consumer booster discussed previously, the Joint Proposal does not offer any actual solutions to interference from higher-powered boosters that fall into the CEO category. Instead, it defers those solutions to an unidentified industry standards committee, at some unspecified date. That is, the Joint Proposal figuratively kicks that can down the road. The prospects for a practical solution from that approach are slim to none. One reason is that the standards committee would be assembled from the same industry that has already had 25 years to provide adequate signal coverage to rural America, and has utterly failed to do so.

The Joint Proposal specifies that Certified Engineered and Operated ("CEO") boosters are required to be designed and installed only by certified installers. These installers must coordinate design and installation matters with all carriers who may be affected, which may include non-participating carriers or public safety entities. It is assumed that carriers and public safety entities will disclose and share all relevant engineering data, including perhaps, confidential and proprietary data, with third party installers so that they can do their job. If that assumption proves false, the phrase "certified engineered and operated" is just a meaningless moniker.

As a practical matter, we believe the proposed CEO installation summarized above will ultimately prove unworkable. The engineering services underlying the CEO certification and installation processes are expected to be very expensive. Who will bear these costs? The consumer?

Millions of buildings and other facilities are expected to require these CEO services, yet there are few resources presently available to perform the work, and it is not clear the industry would ramp up its capacity to provide an army of installers within a reasonable period of time, if ever. Carriers have already stated they do not have the internal resources available to support such a venture. Furthermore, because networks continuously change in size and shape as new cell sites are built and old ones decommissioned, the CEO efforts will be ongoing. Isn't it far easier and more economical to update the removable memory of an intelligent booster?

9. The solutions in the Joint Proposal are at best incomplete, speculative, and not likely to ever be realizable.

From the previous discussions, it seems clear that most, if not all, of the solutions in the Joint Proposal are ill considered, speculative, easily circumvented, and unrealizable without fundamental and unlikely changes in the wireless networks. For brevity, we will simply call these solutions "unripe". In our opinion, it is extremely unlikely that any of these unripe solutions can ever come to fruition.

We attribute the unripe ideas in the Joint Proposal to a very short incubation period, which only began with the Commission's release of the NPRM on April 6, 2011. While we certainly

applaud efforts to initiate a dialogue and formulate a framework to resolve the many technical issues raised in these proceedings, advancing a hastily prepared proposal that is frequently in conflict with the facts is, on balance, a disservice to the industry, to the consumer, and to these proceedings.

Perhaps the best example of the Joint Proposal's unripe ideas is the use of the Bluetooth® open wireless technology to control a signal booster from a handset equipped with GPS. At the present time, there are no wireless network protocols in place to do this, nor is it clear that one could ever be developed. For example, a booster may be expected to amplify the output of multiple handsets, and a single network would not be able to determine their individual identities. Furthermore, there are no protocols in place that would allow a network to retrieve the GPS-derived locations of a handset, determine the need for signal boosting across one more blocks of spectrum, and then somehow deliver commands to the booster using a Bluetooth connection. There are no protocols to resolve conflicts when a booster receives simultaneous commands from more than one network, or to resolve conflicts when more than one network or handset attempts to gain control of the Bluetooth connection. For that matter, not all handsets are presently equipped with GPS or Bluetooth. For those handsets that do support GPS, there is no guarantee that they will have line of sight to the satellites or otherwise use GPS to determine its location in a timely manner.

Even if the Bluetooth dream could somehow be realized, then the resulting operational control of the booster would be best regulated under "blanket licensing" rules and not the new "license-by-rule" proposed in the NPRM because carriers would have sole control of the booster devices operating on their respective networks.

Another unripe idea contained in the Joint Proposal is that mobile, high powered boosters could be discouraged or constrained by requiring that consumer boosters with more than 50 dB of gain not use an input power of 12 volts DC, and that those same boosters not use either FME or SMA type coaxial connectors. These requirements, however, are very easily circumvented by using mobile power inverters, which convert 12 Volts DC to 110 volts AC, and by using commercially available RF adapters that are readily available online and at electronics retailers.

The above are only the highlights of unripe ideas and recommendations for both consumer and CEO grade boosters set forth in the Joint Proposal.

In contrast, the components and interfaces required for an intelligent booster are available now and well within the state of the art. Their combined costs put intelligent boosters well within the reach of the consumer. They do not suffer the operational problems associated with hastily improvised workarounds. When compared to an intelligent booster, devices that might someday conform to the Joint Proposal must be viewed with great skepticism, and will most likely require an extraordinarily long production schedule to bring them to market, if ever. It follows that the Joint Proposal should be viewed for what it truly is, a complicated, unworkable scheme that wrenches high powered boosters from the hands of those consumers who truly need them in rural and underserved areas.

From the above, it is seen that the arbitrary creation of the CEO booster category, which encompasses practically all currently available signal boosters, and which then vaguely assures that industry will tackle their performance and distribution at some unspecified date, completely ignores the purpose and intent of the NPRM. Giving consumers a 600 mW placebo, while indefinitely banning all other boosters from their use is nothing but smoke and mirrors. It has taken years to bring these problems to a public forum in these proceedings, and it would do consumers a huge disservice to allow schemes such as the Joint Proposal to effectively hijack them, leaving the consumer with no relief in rural and fringe coverage areas.

In view of the above, we encourage the Commission to dismiss the CEO booster category as a thinly-veiled attempt by industry to ban signal boosters and remove them from the hands of individual consumers.

The Choice between Sunset and Grandfathering Is a False Choice.

What should be the fate of existing boosters presently in the hands of consumers? The Commission has invited comments concerning whether they should be sunsetted or grandfathered, including those that do not meet the proposed safeguards.

Smart Booster continues to believe that signal boosters that can not operate under the existing paradigm of "blanket licensing" should have their equipment authorizations revoked. From the very beginning, when these devices were first marketed, their use by consumers was never legal without explicit carrier consent. Furthermore, the record developed in these proceedings clearly demonstrates that signal boosters not conforming to blanket licensing provisions continue to interfere with the networks. To grandfather these devices would simply reward the reckless actions of a cottage industry.

As a practical matter, the choice between sunsetting and grandfathering put forth by the Commission is a false one because it cannot be implemented. Those devices already in the hands of consumers will remain there, regardless of whether the Commission decides to sunset or grandfather their use. Enforcement and interference abatement efforts will continue on a tedious and time-consuming case-by-case basis. In each case, the Commission will resist imposing forfeiture by the consumer, particularly when that consumer can not be expected to participate fully in these proceedings.

The NPRM asks whether grandfathered boosters should be subject to a registration process adopted as a result of this proceeding. We believe that it is impossible to identify existing owners of legacy booster devices, and that therefore, the registration database will be off to a bad start, containing tens, if not hundreds of thousands of omissions. The inability to identify and register grandfathered legacy boosters is strong evidence against the creation and administration of the registration process, the registration database, and the clearinghouse.

Note that for an intelligent booster, the question of whether to grandfather or sunset never needs to be asked. If intelligent signal boosters must ever be recalled, all that is needed is to halt the issuance of periodic memory card updates. When the expiration dates on the cards in

the deployed boosters have passed, the intelligent boosters are essentially recalled from the marketplace.

Comments by T-Mobile and Blooston Licensees Support the Use of Intelligent Boosters

In contrast to the many red flags raised by the Joint Proposal of Verizon and Wilson Electronics, Smart Booster agrees with many of the comments submitted by T-Mobile with respect to essential and desirable features. Actually, those features point with remarkable clarity to an intelligent booster.

In particular, T-Mobile specifies that, "signal boosters must at a minimum incorporate the following: Technologies that limit operation to carrier-specific frequencies; ...maximum power limits; automatic gain control; and oscillation detection." As has been explained in detail by previous submissions to these proceedings, intelligent boosters intrinsically provide all of these features.

Because an intelligent booster includes an updateable and removable memory card, it knows what frequencies are in use for a particular carrier at a particular location. Further, it knows how much amplification is needed at that location. Finally, its bi-directional amplifier will include oscillation prevention circuitry. No other signal booster can offer all of these features in a single device.

Smart Booster also agrees with T-Mobile that boosters must include a feature for remote shut down. T-Mobile writes that, “To ensure that interference issues can be rapidly addressed in situations where the device is causing interference… the Commission should require signal boosters to incorporate technology that permits CMRS licensees to shut down… the device.” Intelligent boosters do indeed incorporate a kill switch, which can be activated by an authorized technician using a remote control unit.

Smart Booster strongly agrees with the T-Mobile suggestion that, "the Commission should declare that signal boosters will be treated like other third-party devices. Like a handset, a signal booster transmits communications by radio and thus cannot be used without a license.

These devices should be 'licensed' in the same manner as handsets--pursuant to the blanket authorization held by the carrier."

In its previously submitted Comments, Smart Booster described the close similarities of intelligent signal boosters with handsets, with respect to licensing individual devices. Further, Smart Booster explained that intelligent boosters are activated by insertion of a memory card just as handsets are activated by insertion of a SIM (Subscriber Identification Module) card. It follows that an intelligent signal booster would be licensed in the very same manner as a handset, and as T-Mobile suggests, "pursuant to the blanket authorization held by the carrier." Smart Booster most strongly agrees with T-Mobile's suggestion for such blanket authorization. For intelligent boosters, there is no need whatsoever for license-by-rule as proposed in the NPRM.

Intelligent boosters readily solve a problem identified by T-Mobile concerning persistent interference from certain models in certain environments. T-Mobile explains that:

> *"…if numerous carriers are receiving interference complaints regarding a certain signal booster model and these complaints in the aggregate exceed the established complaint threshold… the carriers should be entitled to deny future registrations involving that particular signal booster model. Similarly, if… interference from boosters deployed in certain environments (e.g., on boats, in marinas, etc.) exceeds industry established thresholds, it should be brought to the attention of carriers who should be entitled to prohibit the use of signal boosters in such environments."*[5]

An intelligent booster readily solves the above interference problems. For the case of certain booster models, it is simply a matter of ceasing to issue the updateable memory card. When the existing memory cards expire, those booster models will cease to operate. For the case of problem environments, such as boats in a marina, the carrier can specify in the memory card that amplification is either impermissible or reduced to non-interfering levels at those locations.

If a particular subscriber is uncooperative in resolving any interference that might originate with his or her intelligent booster, then the carrier has the option to halt periodic memory updates for that specific device. In this way, carriers can be confident that an individual defective, damaged or illegally modified booster will never again interfere with any network. In addition, this remedy

[5] Comments of T-Mobile USA, Inc., NPRM Docket 10-4, July 25, 2011, pages 9-10.

is complemented by the carrier's authority to shut down a rogue booster by activating its built-in kill switch from a remote control unit.

From the above, it is seen that there is no need for a complicated registration process or for a national clearinghouse.

Concerning blanket authorization, Smart Booster concurs with T-Mobile that license-by-rule would be counterproductive with respect to promoting technical innovation by the carriers.

In view of the substantial agreements as described above, Smart Booster encourages and invites a dialogue with T-Mobile concerning intelligent boosters and how they can satisfy both consumer needs in rural and fringe coverage areas, and carrier concerns about interference.

Intelligent boosters are clearly supported by Comments submitted by Blooston Licensees[6]. They state that they "believe that the best method for regulating signal booster devices is to treat them as subscriber equipment, much like handsets and air-cards, so that wireless carriers can ensure that these devices only operate on frequencies utilized and at locations authorized by the subscriber's carrier." They further "strongly advocate requiring signal booster equipment to be carrier specific and carrier activated."

Smart Booster has submitted similar comments on multiple occasions, articulating the essential features of intelligent boosters. The removable, updateable memory cards of intelligent boosters guarantee that they will operate only where and when they are actually needed. The carriers can elect to distribute the cards and in that way control the activation of signal boosters. The carriers can also influence the contents of the memory cards with respect to locations requiring boosters and frequencies in use at those locations.

Smart Boosters has yet to engage in dialogue with either T-Mobile or with Blooston Licensees, and their Comments were submitted without any prompting from us. That their comments support intelligent boosters demonstrates a convergence of thought towards the only logical and compelling solution to the problems discussed in the NPRM.

[6] The Blooston Licensees is a group of seventeen rural wireless network providers and public safety entities.

Conclusions

The intelligent booster remains a compelling and the only logical solution that will meet consumer expectations for reliable wireless communication in rural and fringe coverage areas, and will simultaneously prevent interference to wireless networks. It will also comply with FCC regulations concerning Quiet Zones, radio telescopes and other protected facilities. No other booster can do this.

Smart Booster invites and encourages dialogues with wireless network providers to customize intelligent boosters so that all concerns about interference are answered. So far, the networks have not been forthcoming in that regard, and that suggests the FCC needs to take a more proactive role towards initiating contact and serious discussions.

The Joint Proposal submitted by Verizon and Wilson Electronics attempts a dialogue; however, consumer needs for a robust and reliable booster in rural and fringe areas are totally neglected in deference to Verizon's demand for protection against interference from the sort of booster that Wilson presently manufactures and sells. Successful emergency E-911 calls have less chance of completion under the Joint Proposal than under present conditions. Further, no protection is provided for Quiet Zones and other facilities covered by FCC regulations.

It is not an exaggeration to regard the Joint Proposal as a certain prescription for both tragedy and disaster. It will be a tragedy for the consumer in rural and fringe coverage areas because common sense, supported by detailed engineering calculations, shows conclusively that the proposed consumer grade booster will be totally useless. Most E-911 calls will not be connected. It will be a disaster for the wireless networks because, once again, common sense, supported by detailed engineering calculations, shows conclusively that the proposed consumer grade booster will perpetuate harmful interference in urban and other areas densely populated with base stations.

Accordingly, Smart Booster urges the Commission to dismiss all aspects of the Joint Proposal and urges V-Comm to go back to the drawing board and critically reconsider its specifications.

Smart Booster completely agrees with T-Mobile that license-by-rule as proposed in the NPRM is not only unnecessary but that it would be counterproductive for the wireless communication industry. Intelligent boosters are completely compatible with existing blanket licensing rules. Their updateable and removable memories are analogous to the SIM (Subscriber Identification Module) chips, which are used to activate and effectively license individual handsets. Thus, the memory cards of the intelligent boosters empower the carriers to license each device under blanketing rules. There is no need for the carriers to surrender any authority over their licensed spectrum.

Accordingly, Smart Booster urges the Commission to abandon all aspects of its proposal for license-by-rule.

As we articulated in our Comments dated July 22, 2011, all that is necessary for the widespread use and acceptance of intelligent boosters are the following regulatory reforms:

1. Amend Rule 22.923 to permit boosters to be inserted between handsets and base stations, and update certain of its definitions.
2. Require all boosters to have a minimum amount of intelligence so that they know where to amplify, when to amplify, how much to amplify, and within which spectrum blocks to amplify.
3. Require that all intelligent boosters have a provision to guarantee that their intelligence is current.
4. Decertify all boosters that do not meet the above minimum requirements.
5. Require networks to support intelligent boosters by providing databases appropriately encoded on a compatible memory card in a timely manner.

In our Reply Comments here, and in view of the only Joint Proposal submitted thus far, Item 5 deserves special emphasis. To that end, there is clearly a need for continued dialogue between booster companies and the wireless providers.

Respectfully submitted,

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Dated: August 24, 2011.
VIA: ECFS.

CERTIFICATE OF SERVICE

I, Jeremy K. Raines, Ph.D., P.E., do hereby certify that on this 24th day of August, 2011, I caused copies of the foregoing "Comments – Notice of Proposed Rule Making" FCC 11-53, Docket 10-4, to be delivered to the following via electronic or First Class US mail.

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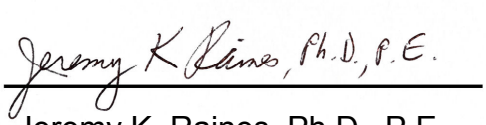

Jeremy K. Raines, Ph.D., P.E.
For Millard / Raines Partnership

FCC 2.803 Compliance Notice:

Prototype - Not for Sale
The Smart Booster device has not been authorized as required by the rules of the Federal Communications Commission. This device is not, and may not be, offered for sale or lease, or sold or leased, until authorization is obtained.

Intellectual Property Notice:

ATTACHMENT 1

Wilson Booster Specifications					
Data compiled from www.wilsonelectronics.com Retrieved Aug 6, 2011					
IN-BUILDING					
Large	Model	Output Power (mW)	Radio Service / Band	Gain	FCC ID#
	801108	3000	CELL-A	60	PWO8011SB
	801110	3000	CELL-B	60	PWO8011SB
	804006	3000	SMR	60	PWO8040SB
	801506	3000	880-915 / 925-960	60	Not for sale in US
	801606	3000	1710-1785 / 1805-1880	60	Not for sale in US
	801365	2000	PCS	65	FCC ID# not found on web site.
	801165	3000	CELL	65	FCC ID# not found on web site.
	801265	1202	CELL-PCS	65/70	PWO271265
	801280	1202 / 1122	CELL-PCS	65/70	PWO271265
Mid-Size					
	801262	2500	CELL-PCS	62/65	PWO271265
	804005	3000	SMR	50	PWO8040SB
	801105	3000	CELL ONLY	50	PWO8011SB
Small					
	801245	1202 / 1122	CELL-PCS	55/60	PW0271265
	805201	2000	CELL-PCS	40/42	PWO271220SA
	801240	1000	CELL-PCS	40/42	PWO271240SA
	801247	2500	CELL-PCS	55	PW0271265
	815226	1820	CELL-PCS	20	PWO2B5225
MOBILE					
Cradle	Model	Power	Band	Gain	
	805206	2000	CELL-PCS	40/42	PWO271220SA
	805201	2000	CELL-PCS	40/42	PWO271220SA
	815226	1820	CELL-PCS	20	PWO2B5225
	2B5225	1820	CELL-PCS	20	PWO2B5225
Direct Connect					
	811225	776 / 1514	CELL-PCS	12	PWO2B1225

	811101	3000	CELL ONLY	10/14	FCC ID# not found on web site.
	811201	3000	CELL-PCS	10/14	FCC ID# not found on web site.
	811701	3000	890-960 / 1710-1880	10/14	FCC ID# not found on web site.
	811901	3000	890-960 / 1885-2200	10/14	FCC ID# not found on web site.
	814021	5000	SMR	10/14	FCC ID# not found on web site.
	811210	3000	CELL-PCS	25/25	PWO819DA
	811710	3000	890-960 / 1710-1880	25/25	Not for sale in US
	811910	3000	891-960 / 1885-2200	25/25	Not for sale in US
Wireless					
	801201	3000	CELL-PCS	40/45	PWO271201SA
	801230	1700	CELL-PCS	40/42	PWO271230SA
	801240	1000	CELL-PCS	40/42	PWO271240SA
	804002	3000	SMR	40	PWO806WV
	801101	3000	CELL ONLY	40	PWO2B1401SA & PWO824WV
MACHINE-TO-MACHINE					
Laptop	Model	Power	Band	Gain	
	801262	2500	CELL-PCS	62/65	PWO271265
	801101	3000	CELL ONLY		PWO2B1401SA
	811201	3000	CELL-PCS	10/14	FCC ID# not found on web site.
	811701	3000	890-960 / 1710-1880	10/14	FCC ID# not found on web site.
	811901	3000	896-960 / 1885-2200	10/14	FCC ID# not found on web site.
	814021	5000	SMR	10/14	FCC ID# not found on web site.
	801201	3000	CELL-PCS	40/45	PWO271201SA
	801240	1000	CELL-PCS	40/42	PWO271240SA
	801247	2500	CELL-PCS	55	PW0271265
Machine to Machine					
	811225	776 / 1514	CELL-PCS	12	PWO2B1225
	811101	3000	CELL ONLY	10/14	FCC ID# not found on web site.
	811201	3000	CELL-PCS	10/14	FCC ID# not found on web site.
	811701	3000	890-960 / 1710-1880	10/14	FCC ID# not found on web

					site.
	811901	3000	890-960 / 1885-2200	10/14	FCC ID# not found on web site.
	814021	5000	SMR	10/14	FCC ID# not found on web site.
	811210	3000	CELL-PCS	25/25	PWO819DA
	811710	3000	890-960 / 1710-1880	25/25	Not for sale in US
	811910	3000	890-960 / 1885-2200	25/25	Not for sale in US
	2B1401	2339	800/1900 with GPS		PWO2B1401SA
NOT FOR DOMESTIC SALE, (Includes Duplicate Part Numbers)					
	811510		CELL (SINGLE-BAND)		Not for sale in US
	811514				Not for sale in US
	811714				Not for sale in US
	811914				Not for sale in US
	801106				PWO8011SB
	801170				Not for sale in US
	801306				PWO8013SB
	801370				Not for sale in US
	811207	2239	800-1900	20	PWO2B1401SA
	811209	2239	800-1900	20	PWO2B1401SA
	801106				PWO8011SB
	801170				Not for sale in US
	801306				PWO8013SB
	801370				Not for sale in US
	801212				PWO271201SA
	801215				PWO271201SA
	801701				Not for sale in US
	801501				Not for sale in US
	801601				Not for sale in US
	801712				Not for sale in US
End of Listing.					

ATTACHMENT 2

Summary of Effective Radiated Output Power (ERP) for Recently Authorized Handsets

FCC ID:	Manufacturer	Trade Name	FCC Approved	ERP (dBm)	ERP (mW)*	Carrier(s) Offering this Handset
L6ARDV70CW	RIM	BlackBerry Bold 9900	7/19/2011	32.16	1644	AT&T, T-Mobile (both tentative)
L6ARDH70CW	RIM	BlackBerry Torch 9850	7/28/2011	32.16	1644	Sprint, (tentative)
L6ARDU70CW	RIM	BlackBerry Bold 9930	7/11/2011	32.16	1644	Sprint, Verizon
BCGA1303B	Apple	iPhone 3GS	6/8/2009	30.96	1247	AT&T
O8F-PIXYW	Palm	Pixi Plus (GMS)	4/16/2010	30.6	1148	AT&T
NM8PB65100	HTC	my Touch 3G Slide	4/8/2010	30.45	1109	T-Mobile
BCG-E2380B	Apple	iPhone 4 (GSM)	6/18/2010	30.1	1023	AT&T
PY7A3880087	Sony -Ericsson	Xperia Play (GSM)	3/11/2011	29.8	955	Not yet offered by any carrier.
V65SCP-8600	Kyocera		4/8/2011	29.2	832	T-Mobile
V65SCP-8600	Sanyo / Kyocera	Zio	7/26/2010	29.2	832	Cricket, Sprint
PY7A1880033	Sony -Ericsson		3/11/2011	29.11	814	Not yet offered by any carrier.
JYCP2030	Pantech Co, Ltd	Breeze III	3/30/2011	28.8	759	AT&T
O8F-CASY	Palm	Pre Plus (GSM)	3/15/2010	28.45	700	AT&T
(*) Radiated EPR, corrected relative to a dipole.						

Partial listing of recently authorized devices having an output power greater than 600 mW ERP.